



Wi-Fi Link Controller Linux Release Notes

Introduction

This release notes describes the software deliveries of the ATWILC1000 and ATWILC3000. The ATWILC1000 supports only Wi-Fi, whereas, the ATWILC3000 supports Wi-Fi and Bluetooth.

The ATWILC software releases are available on github: github.com/linux4sam

The Firmware, Demo, Tools and pre-built binaries are available on github.com/linux4wilc

The deliveries are tested against the SAMA5D4 Xplained board running on Linux Kernel 5.10 only, and may be compatible with any other Linux kernel and platform that runs Linux.

Notes: All references to the ATWILC module includes all the devices listed below, unless otherwise noted:

- ATWILC1000
- ATWILC3000

Table of Contents

Introduction.....	1
1. ATWILC Software Architecture.....	3
2. ATWILC Release Contents.....	4
3. ATWILC Release Features.....	5
4. Release Revision History.....	6
4.1. ATWILC Linux Release v15.6.....	6
4.2. ATWILC Linux Release v15.5.....	6
4.3. ATWILC Linux Release 15.4.1.....	6
4.4. ATWILC Linux Release v15.4.....	7
4.5. ATWILC Linux Release v15.3.1.....	7
4.6. ATWILC Linux Release v15.3.....	7
4.7. ATWILC Linux Release v15.2.....	7
4.8. ATWILC Linux Release v15.1.....	8
4.9. ATWILC Linux Release v15.0.....	8
4.10. ATWILC Linux Release v14.4.....	9
4.11. ATWILC Linux Release v14.3.....	9
4.12. ATWILC Linux Release v14.2.....	9
5. Limitations.....	10
The Microchip Website.....	11
Product Change Notification Service.....	11
Customer Support.....	11
Microchip Devices Code Protection Feature.....	11
Legal Notice.....	11
Trademarks.....	12
Quality Management System Certified by DNV.....	12
Worldwide Sales and Service.....	13

1. ATWILC Software Architecture

The following figures illustrate the ATWILC architecture of the Wi-Fi and Bluetooth software.

Figure 1-1. ATWILC Wi-Fi Software Architecture

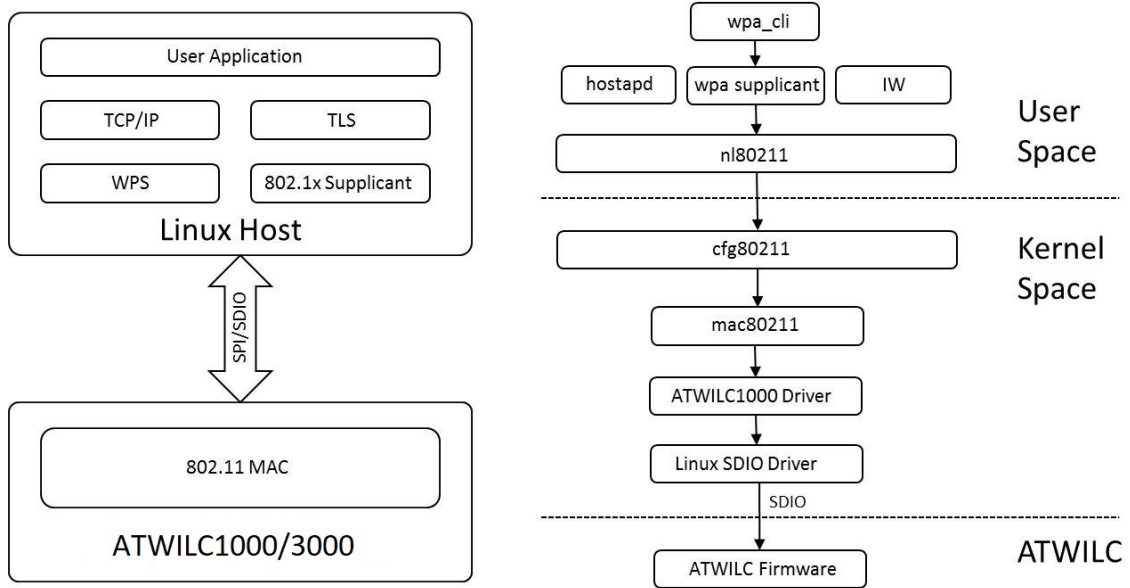
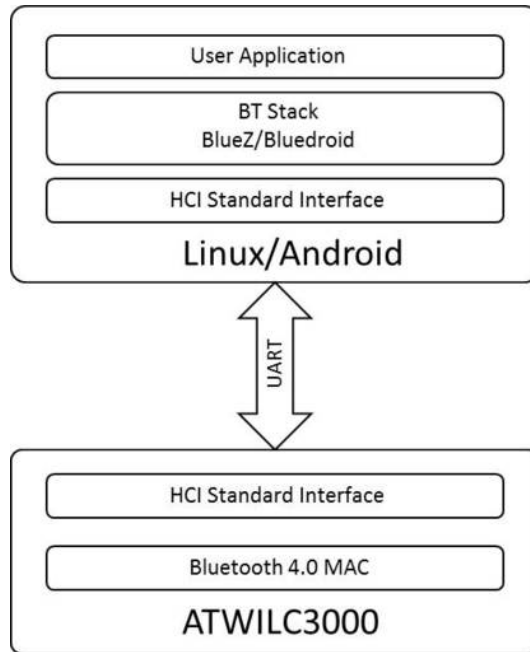


Figure 1-2. ATWILC Bluetooth Software Architecture



2. ATWILC Release Contents

The latest ATWILC Linux Release software deliverables are available on following git hub repositories.

Software/Tools	Github Location	Description
Microchip ATWILC1000/3000 Wireless Devices Firmware binaries	github.com/linux4wilc/firmware	This folder contains the following files: <ul style="list-style-type: none"> wilc1000_wifi_firmware.bin: Wi-Fi STA-P2P-AP concurrency firmware for ATWILC1000. wilc3000_wifi_firmware.bin: Wi-Fi STA-P2P-AP concurrency firmware for ATWILC3000. wilc3000_wifi_firmware_ua.bin: Wi-Fi STA-P2P-AP concurrency firmware for ATWILC3000 for the UA module. wilc3000_ble_firmware.bin: BLE firmware for ATWILC3000. wilc3000_ble_firmware_no_rtc.bin: BLE firmware for ATWILC3000 boards that does not have RTC.
Microchip ATWILC1000/3000 Linux drivers	github.com/linux4microchip/linux/tree/master/drivers/net/wireless/microchip/wilc1000	Linux driver examples for ATWILC1000 and ATWILC3000 for SAMA5D4 Xplained running Linux kernel 5.10.
ATWILC1000/3000 Tools	github.com/linux4wilc/tools	Gain builder tools for ATWILC1000/3000
ATWILC Demo Package	github.com/linux4wilc/wilc_demo	This folder contains the following files: linux_kernel_5.10_images: Pre-built Linux 5.10 image for SAMA5D4.
Microchip Linux Kernel 5.10.x	github.com/linux4microchip/linux	Microchip Linux kernel source tree
Buildroot	github.com/linux4sam/buildroot-at91	Buildroot for Microchip SoC (aka AT91) - use with buildroot external tree
buildroot-external-microchip	github.com/linux4sam/buildroot-external-microchip	Buildroot External for Microchip SoC (aka AT91)

3. ATWILC Release Features

The ATWILC module supports the following features.

1. Wi-Fi Station (STA)
 - IEEE 802.11 b/g/n
 - Open, Wi-Fi Protected Access (WPA)/WPA2 personal, WPA/WPA2 enterprise security and ATWILC1000 supports WPA3 Personal and Enterprise in addition to the aforementioned security suites
2. Wi-Fi Access Point (AP)
 - IEEE 802.11 b/g/n
 - Open, WPA/WPA2 personal, WPA/WPA2 enterprise security and ATWILC1000 supports WPA3 Personal and Enterprise in addition to the aforementioned security suites.
 - Supports eight stations
3. Wi-Fi Protected Setup (WPS)
 - Push Button
 - PIN
4. Wi-Fi direct
 - P2P Client
 - P2P GO
5. Concurrent modes
 - STA-STA
 - STA-AP
 - STA-P2P Client
 - STA-P2P GO
 - AP-P2P Client
6. Antenna diversity control for Wi-Fi
7. Bluetooth (ATWILC3000 only)
 - Bluetooth Low Energy (BLE) 4.0 support
 - Modes of operation: Central and peripheral support
 - Number of Connections: Supports seven clients
 - Adaptive frequency hopping
 - Coexistence with Wi-Fi
8. Power save
 - Beacon monitoring mode
 - Low-power mode when disconnected
 - Host suspend support
 - Wake-up host on wireless LAN events
9. RF version number 01.1

Note: RF version number format is xx.y, where xx: "Major" and y: "Minor". Changes in Major number requires re-tests and possibly re-certification.

4. Release Revision History

4.1 ATWILC Linux Release v15.6

The following are the new features in ATWILC Linux Release v15.6

1. WPA3 Support (WILC1000 only)

The following are the bug fixes for ATWILC Linux release v15.6

1. Fix deprecated WEP on WILC1000/3000
2. Fix 11b RF Carrier Suppression on WILC1000
3. Fix crash issue in WILC driver while VMM transfer entries exceeding (supported) 64 slots.
4. Fix FragAttack vulnerability issues(refer below table)

Vulnerability#	Description
CVE-2020-26140	Accepting plaintext data frames in a protected network
CVE-2020-26143	Accepting fragmented plaintext data frames in a protected network
CVE-2020-24588	Accepting non-SPP A-MSDU frames
CVE-2020-24586	Not clearing fragments from memory when (re)connecting to a network
CVE-2020-26139	Forwarding EAPOL frames even though the sender is not yet authenticated
CVE-2020-26147	Reassembling mixed encrypted/plaintext fragments
CVE-2020-26146	Reassembling encrypted fragments with non-consecutive packet numbers
CVE-2020-26144	Accepting plaintext A-MSDU frames that start with an RFC1042 header with EtherType

4.2 ATWILC Linux Release v15.5

The following are the bug fixes for ATWILC Linux Release v15.5

1. Fix Command(crc7) and Data(crc16) CRC check enabling on WILC SPI bus
2. Fix WILC AP mode hang up issue
3. Fix WILC1000 - Specific AP's are not getting detected during scan
4. Fix WILC3000 SPI: Sometimes bus communication error observed during PS mode
5. Fix WILC 3000 BLE fails to start advertising under some application command sequence
6. Fix WILC1000 SPI: Fix TXQ starvation issue
7. Fix Default GPIO's values are not getting populated
8. Fix WILC SPI failure recovery mechanism issue
9. Fix Gain table settings for WILC1000 and WILC3000 UA

4.3 ATWILC Linux Release 15.4.1

The following are the bug fixes for ATWILC Linux Release v15.4.1

1. Fix network packet flow in WILC 1000/3000 WiFi Driver
2. Fix HIF instability issues in WILC 3000 - In PSM mode due to DC-DC trim values
3. Fix HIF instability issues in WILC 3000 - In WiFi-BLE co-existence
4. Fix Memory leak in WILC driver scan while connect/disconnect AP
5. Fix WiFi Driver for SDIO suspend/resume
6. Fix WILC 1000 SPI communication stall issues

7. Fix WILC 1000 SDIO failures when power save mode is enabled

4.4 ATWILC Linux Release v15.4

The following are the new features in ATWILC Linux Release v15.4

1. WILC3000: Change Gain with Temperature to avoid in-band spurs
2. Migration to Linux4SAM git

The following are the bug fixes for ATWILC Linux release v15.4

1. Fix BLE Sneyntooth Vulnerability
2. Fix SDIO OOB Interrupt
3. Update WILC1000UB Gain Table

4.5 ATWILC Linux Release v15.3.1

The following are the bug fixes for ATWILC Linux release 15.3.1:

1. Failure to wake some parts through SPI .
2. iperf stalls during longevity tests.

4.6 ATWILC Linux Release v15.3

The following are the new features in ATWILC Linux Release v15.3:

1. Reed IQ imbalance calibration data from Efuse.
2. Dynamically add network interfaces for ATWILC driver.
3. Add optional rtc_clk property to dts and use it in the driver.

The following are the bug fixes for ATWILC Linux release v15.3

1. Apply feedback comments from staging community to the driver.
2. Fix for CF-End packets on air when multiple WILC stations are connected to the same AP.
3. Fix crack Attack failure – Upgrade wpa_supplicant on buildroot to 2.7 and latest security fixes.
4. Fix memory leak when connecting/disconnecting to AP continuously.
5. Fix for Passive scanning feature.
6. Avoid controlling power save state from the driver while obtaining IP and scanning.
7. FW crash when switching between AP via link loss.
8. Fix for low Tx power when using CW Tone in the Ch/C GUI tool.
9. Clear pending interrupts while initializing/de-initializing the device.
10. WILC3000 Low Rx performance with 11n rates.

4.7 ATWILC Linux Release v15.2

The following are the bug fixes for ATWILC Linux release v15.2.

1. Regression in v15.1 while connecting to WPA AP.
2. Fix for corrupted packets reported on the Monitor mode.
3. Better consistency to find ATWILC softAP's in stations' scan results.
4. Consistent assignment of printed MAC address to wlan0.
5. Better TX performance with significant temperature changes.
6. SoftAP fails to operate correctly when its MAC address is assigned from the host.
7. Staging review fixes.
8. GPIO descriptor related changes. Requires changes on the host's Device Tree file.

9. Fix for crash from v15.1 when switching between AP and station interface.
10. Enable Antenna diversity using GPIO3 for ATWILC3000.
11. SoftAP fails to associate eighth station.
12. Improve transmission performance in noisy environment.
13. Fix regression causing degradation in BLE RX Sensitivity.
14. Fix for ATWILC firmware overwriting MAC address in received broadcast packets.
15. Incorrect pointer passed while getting `IF` handler.
16. Refactor `coreconfigurator.c` file to use API's provided in kernel framework.
17. High latency on receiving firmware start interrupt and intermittent lower throughput on SAMA5D4 board.
18. iPhone intermittently fails to connect to ATWILC SoftAP.

4.8 ATWILC Linux Release v15.1

The following are the new features in ATWILC Linux Release v15.1:

1. Use mainline buildroot git.buildroot.net/buildroot/ tag 2017_08.
2. Idle (Disconnected) power save mode.
3. Ability to change WILC mac address dynamically from Linux host.
4. Support for sam-ba 3.2 to flash prebuilt images.
5. CAPI Agent code added to Buildroot.
6. Support compilation against Linux 3.10 and 4.14.
7. Single kernel module is now used; either `wilc-sdio.ko` or `wilc-spi.ko` depending to the used bus.
8. Firmware binaries are now compiled as part of the Linux kernel's image, instead of the file system image. The firmware should be located on the target under `/lib/firmware/mchp`.
9. `Chip_en` and `Reset_n` GPIOs' numbers are now retrieved from the platform's device tree file (dts).
10. BLE example application (btgatt-server) for BlueZ 5.46.
11. Use Linux Style Tracing System.
12. Implement Linux community recommendations and notes.
13. Ability to change Antenna diversity GPIOs dynamically.

The following are the bug fixes for RTP:

1. Wi-Fi/BLE Power save mode.
2. Host power save (Suspend/Resume).
3. Antenna diversity.
4. Scan results should not include APs from adjacent channels.
5. Fixed concurrency regression.
6. Fixed spurious emissions issue in Wi-Fi/BLE coexistence mode.
7. Replayed packets are not discarded in the firmware.
8. Second Wi-Fi interface failure.
9. Concurrency failure.

4.9 ATWILC Linux Release v15.0

The following are new features in ATWILC Linux Release v15.0:

1. Used staging ATWILC driver
2. ATWILC3000 WFA certification.

The following are the bug fixes for RTP:

1. DUT disconnects from the AP when AP is in mixed mode.
2. Updated ATWILC1000 and ATWILC3000 gain tables
3. Autorate Algorithm enhancements

4.10 ATWILC Linux Release v14.4

The following are key enhancements and bug fixes in ATWILC Linux Release v14.4:

1. Fixed ATWILC1000 loading error.

4.11 ATWILC Linux Release v14.3

The following are key enhancements and bug fixes in ATWILC Linux Release v14.3:

1. European Telecommunications Standards Institute (ETSI) certification support to implement per channel Rx Received Signal Strength Indicator (RSSI) offset.
2. Increased BLE transmit power granularity to 7 levels.
3. Eliminate spurious emissions for BLE.
4. Avoid user setting BLE power to the level exceeding Federal Communications Commission (FCC) recommendations.
5. Fixed for low-side injection for higher channels on Bluetooth.
6. Adding support on linux to change regulatory domains.
7. Fixed to enable BT test mode from characterization GUI.
8. Added new feature to the characterization GUI to send Host Controller Interface (HCI) commands, dynamically.
9. Support for SPI on ATWILC3000 Shield board.
10. Updated porting guide and linux user guide.
11. Suspend/Resume support tested overnight.
12. Phased out ATWILC1000 RevA (ATWILC10002xx).
13. Eliminated Lint error in Wi-Fi firmware.
14. Eliminated GCC warning in Wi-Fi driver.

4.12 ATWILC Linux Release v14.2

The following are key enhancements and bug fixes in ATWILC Linux Release v14.2:

1. Fixed WEP40 and WEP104 shared authentication.
2. Antenna diversity for ATWILC3000.
3. Using latest tool chain to compile Wi-Fi firmwares.
4. [ATWILC3000] Support for WILC3000D2.
5. [ATWILC3000] Using PMU code 0x1 as recommended to pass FCC tests, and lowering sleep LDO voltage to code 0xe to minimize sleep current.

5. Limitations

1. Concurrency:
 - Multichannel concurrency is not supported. Concurrent modes have to run on the same channel.
2. P2P Client:
 - By default, the driver acts as a P2P GO to be able to select the channel to overcome the multichannel concurrency limitation.
To use the P2P client mode, the required mode has to be set in `/sys/wilc/p2p_mode`.

```
echo <mode> > /sys/wilc/p2p_mode
```

The Microchip Website

Microchip provides online support via our website at www.microchip.com/. This website is used to make files and information easily available to customers. Some of the content available includes:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases and archived software
- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, Microchip design partner program member listing
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

Product Change Notification Service

Microchip's product change notification service helps keep customers current on Microchip products. Subscribers will receive email notification whenever there are changes, updates, revisions or errata related to a specified product family or development tool of interest.

To register, go to www.microchip.com/pcn and follow the registration instructions.

Customer Support

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Embedded Solutions Engineer (ESE)
- Technical Support

Customers should contact their distributor, representative or ESE for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in this document.

Technical support is available through the website at: www.microchip.com/support

Microchip Devices Code Protection Feature

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Legal Notice

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with

your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Trademarks

The Microchip name and logo, the Microchip logo, AnyRate, AVR, AVR logo, AVR Freaks, BeaconThings, BitCloud, CryptoMemory, CryptoRF, dsPIC, FlashFlex, flexPWR, Heldo, JukeBlox, KeeLoq, KeeLoq logo, Kleer, LANCheck, LINK MD, maXStylus, maXTouch, MediaLB, megaAVR, MOST, MOST logo, MPLAB, OptoLyzer, PIC, picoPower, PICSTART, PIC32 logo, Prochip Designer, QTouch, RightTouch, SAM-BA, SpyNIC, SST, SST Logo, SuperFlash, tinyAVR, UNI/O, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

ClockWorks, The Embedded Control Solutions Company, EtherSynch, Hyper Speed Control, HyperLight Load, IntelliMOS, mTouch, Precision Edge, and Quiet-Wire are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, BodyCom, chipKIT, chipKIT logo, CodeGuard, CryptoAuthentication, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, EtherGREEN, In-Circuit Serial Programming, ICSP, Inter-Chip Connectivity, JitterBlocker, KleerNet, KleerNet logo, Mindi, MiWi, motorBench, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, PureSilicon, QMatrix, RightTouch logo, REAL ICE, Ripple Blocker, SAM-ICE, Serial Quad I/O, SMART-I.S., SQI, SuperSwitcher, SuperSwitcher II, Total Endurance, TSHARC, USBCheck, VariSense, ViewSpan, WiperLock, Wireless DNA, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

Silicon Storage Technology is a registered trademark of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2018, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

ISBN:

Quality Management System Certified by DNV

ISO/TS 16949

Microchip received ISO/TS-16949:2009 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC® MCUs and dsPIC® DSCs, KEELOQ® code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.

Worldwide Sales and Service

AMERICAS	ASIA/PACIFIC	ASIA/PACIFIC	EUROPE
<p>Corporate Office 2355 West Chandler Blvd. Chandler, AZ 85224-6199 Tel: 480-792-7200 Fax: 480-792-7277 Technical Support: http://www.microchip.com/support Web Address: www.microchip.com</p> <p>Atlanta Duluth, GA Tel: 678-957-9614 Fax: 678-957-1455</p> <p>Austin, TX Tel: 512-257-3370</p> <p>Boston Westborough, MA Tel: 774-760-0087 Fax: 774-760-0088</p> <p>Chicago Itasca, IL Tel: 630-285-0071 Fax: 630-285-0075</p> <p>Dallas Addison, TX Tel: 972-818-7423 Fax: 972-818-2924</p> <p>Detroit Novi, MI Tel: 248-848-4000</p> <p>Houston, TX Tel: 281-894-5983</p> <p>Indianapolis Noblesville, IN Tel: 317-773-8323 Fax: 317-773-5453 Tel: 317-536-2380</p> <p>Los Angeles Mission Viejo, CA Tel: 949-462-9523 Fax: 949-462-9608 Tel: 951-273-7800</p> <p>Raleigh, NC Tel: 919-844-7510</p> <p>New York, NY Tel: 631-435-6000</p> <p>San Jose, CA Tel: 408-735-9110 Tel: 408-436-4270</p> <p>Canada - Toronto Tel: 905-695-1980 Fax: 905-695-2078</p>	<p>Asia Pacific Office Suites 3707-14, 37th Floor Tower 6, The Gateway Harbour City, Kowloon</p> <p>Hong Kong Tel: 852-2943-5100 Fax: 852-2401-3431</p> <p>Australia - Sydney Tel: 61-2-9868-6733 Fax: 61-2-9868-6755</p> <p>China - Beijing Tel: 86-10-8569-7000 Fax: 86-10-8528-2104</p> <p>China - Chengdu Tel: 86-28-8665-5511 Fax: 86-28-8665-7889</p> <p>China - Chongqing Tel: 86-23-8980-9588 Fax: 86-23-8980-9500</p> <p>China - Dongguan Tel: 86-769-8702-9880</p> <p>China - Guangzhou Tel: 86-20-8755-8029</p> <p>China - Hangzhou Tel: 86-571-8792-8115 Fax: 86-571-8792-8116</p> <p>China - Hong Kong SAR Tel: 852-2943-5100 Fax: 852-2401-3431</p> <p>China - Nanjing Tel: 86-25-8473-2460 Fax: 86-25-8473-2470</p> <p>China - Qingdao Tel: 86-532-8502-7355 Fax: 86-532-8502-7205</p> <p>China - Shanghai Tel: 86-21-3326-8000 Fax: 86-21-3326-8021</p> <p>China - Shenyang Tel: 86-24-2334-2829 Fax: 86-24-2334-2393</p> <p>China - Shenzhen Tel: 86-755-8864-2200 Fax: 86-755-8203-1760</p> <p>China - Wuhan Tel: 86-27-5980-5300 Fax: 86-27-5980-5118</p> <p>China - Xian Tel: 86-29-8833-7252 Fax: 86-29-8833-7256</p>	<p>China - Xiamen Tel: 86-592-2388138 Fax: 86-592-2388130</p> <p>China - Zhuhai Tel: 86-756-3210040 Fax: 86-756-3210049</p> <p>India - Bangalore Tel: 91-80-3090-4444 Fax: 91-80-3090-4123</p> <p>India - New Delhi Tel: 91-11-4160-8631 Fax: 91-11-4160-8632</p> <p>India - Pune Tel: 91-20-3019-1500</p> <p>Japan - Osaka Tel: 81-6-6152-7160 Fax: 81-6-6152-9310</p> <p>Japan - Tokyo Tel: 81-3-6880-3770 Fax: 81-3-6880-3771</p> <p>Korea - Daegu Tel: 82-53-744-4301 Fax: 82-53-744-4302</p> <p>Korea - Seoul Tel: 82-2-554-7200 Fax: 82-2-558-5932 or 82-2-558-5934</p> <p>Malaysia - Kuala Lumpur Tel: 60-3-6201-9857 Fax: 60-3-6201-9859</p> <p>Malaysia - Penang Tel: 60-4-227-8870 Fax: 60-4-227-4068</p> <p>Philippines - Manila Tel: 63-2-634-9065 Fax: 63-2-634-9069</p> <p>Singapore Tel: 65-6334-8870 Fax: 65-6334-8850</p> <p>Taiwan - Hsin Chu Tel: 886-3-5778-366 Fax: 886-3-5770-955</p> <p>Taiwan - Kaohsiung Tel: 886-7-213-7830</p> <p>Taiwan - Taipei Tel: 886-2-2508-8600 Fax: 886-2-2508-0102</p> <p>Thailand - Bangkok Tel: 66-2-694-1351 Fax: 66-2-694-1350</p>	<p>Austria - Wels Tel: 43-7242-2244-39 Fax: 43-7242-2244-393</p> <p>Denmark - Copenhagen Tel: 45-4450-2828 Fax: 45-4485-2829</p> <p>Finland - Espoo Tel: 358-9-4520-820</p> <p>France - Paris Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79</p> <p>Germany - Garching Tel: 49-8931-9700</p> <p>Germany - Haan Tel: 49-2129-3766400</p> <p>Germany - Heilbronn Tel: 49-7131-67-3636</p> <p>Germany - Karlsruhe Tel: 49-721-625370</p> <p>Germany - Munich Tel: 49-89-627-144-0 Fax: 49-89-627-144-44</p> <p>Germany - Rosenheim Tel: 49-8031-354-560</p> <p>Israel - Ra'anana Tel: 972-9-744-7705</p> <p>Italy - Milan Tel: 39-0331-742611 Tel: 39-0331-466781</p> <p>Italy - Padova Tel: 39-049-7625286</p> <p>Netherlands - Druenen Tel: 31-416-690399 Fax: 31-416-690340</p> <p>Norway - Trondheim Tel: 47-7289-7561</p> <p>Poland - Warsaw Tel: 48-22-3325737</p> <p>Romania - Bucharest Tel: 40-21-407-87-50</p> <p>Spain - Madrid Tel: 34-91-708-08-90 Fax: 34-91-708-08-91</p> <p>Sweden - Gothenberg Tel: 46-31-704-60-40</p> <p>Sweden - Stockholm Tel: 46-8-5090-4654</p> <p>UK - Wokingham Tel: 44-118-921-5800 Fax: 44-118-921-5820</p>